out the remainder; the water is then ſtopped from the wheel, and the chain ſtill continuing hooked to the boat, they will begin to deſcend in regular rotation; the chain, deſcending with the boats, will turn the water-wheel backwards and anſwer as a break to regulate the velocity. On a man arriving at a plane the whole operation is to hook the chain to the third boat, if there are three, or to the ſtern of one, if there is no more, and ſet the wheel in motion; on that boat to which the chain is hooked, mounting the bridge, the water is ſtopped from the wheel, and the whole line of boats begin immediately to deſcend into the lower canal; during which the man attends to the break, and the time in performing this operation, I conceive, will be as follows:

	Minutes.
Hooking the leading chain, - - - -	3
Drawing the firſt boat out with the wheel, - -	1
Deſcending the plane, - - - -	1
Unhooking the leading chain and applying the horſe, -	2
	7

Hence, in a deſcending trade, forty tons may paſs in ſeven minutes.

In aſcending, the ſpeed will conſequently be in proportion to the power of the water-wheel; it will therefore be adviſeable to give power to the wheel in order to ſave time; in riſing there will be three boats out of water on the plane at a time, the plane out of water being ſixty feet long; the boats and their cargoes will weigh about ſeventeen tons, this, on a plane of twenty degrees, will be a reſiſtance of about five tons, friction conſidered, perhaps ſix tons; to raiſe this if I ſuppoſe an overfall wheel fifteen feet diameter, and the roller

roller on which the chain laps one foot and a quarter, or to that effect, by tooth on pinion, the power will increaſe as one to twelve, and one ton actual purchaſe on the wheel will raiſe twelve on the plane; the wheel ſhould therefore be conſtructed to give one and a half tons purchaſe, or nearly ſo; and, for this purpoſe, ſhould hold about two tons of water; ſuch a wheel would perform twelve revolutions in one minute, and draw the boats forty-five feet up the plane in that time, or two hundred and ſeventy feet in ſix minutes, by which they would enter the upper canal.

To perform this operation, the leading chain is continued over the ten boats in the lower canal, and hooked to the ſtern of the laſt boat; the hook of each boat is alſo fixed in a link of the chain; thus the ten chains, being hooked to the leading chain, the wheel is put in motion, and the whole moving forwards aſcend the plane, caſting off from the leading chain as they paſs the bridge, and run into the upper canal, where they are immediately ready for navigation: the whole of this aſcending operation may be performed in ten minutes, the deſcending boats being paſſed in ſeven, the average may be eſtimated nine minutes; hence, forty tons paſſing in nine minutes, three thouſand two hundred may be transferred in twelve hours.

By the before calculation on the water-wheel, in which a very ſufficient power is allowed to raiſe forty tons of cargo, twenty

feet would require, - - -	288 tons water.
In forty tons deſcending - - -	48 tons do.
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